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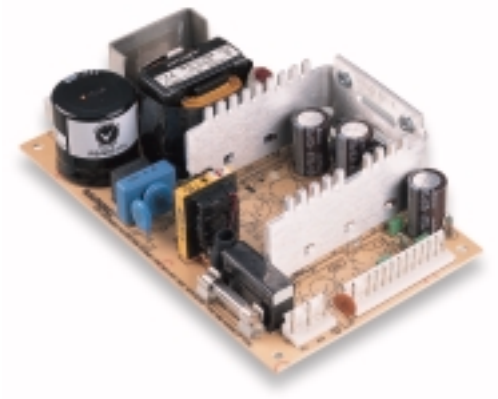
Jameco Part Number 220214 (NFS110-7902P)

NFS110 Medical Series

Single and quad output

ARTESYN TECHNOLOGIES

- **7.0 x 4.25 x 1.8 inch package**
- **Medical, dental and laboratory applications**
- **Overvoltage and short circuit protection**
- **110W with 20CFM**
- **UL, VDE and CSA safety approvals**
- **EN60601-1 and UL2601 medical approvals**



The NFS110 medical series is a 80 to 110W universal input AC/DC power supply on a 7 x 4.25 inch card with a maximum component height of 1.8 inches for use in medical applications. The NFS110 medical series has the same generic feature set as the standard NFS110 series but have been designed with lower safety ground leakage and higher isolation as required for medical safety approval. The NFS110 provides 80W of output power with free air convection cooling which can be boosted to 110W with 20CFM of air. Standard features include overvoltage and short-circuit protection. The series, with full medical safety approval to EN60601 and UL2601, meets conducted emissions EN55022 level A. The NFS110 medical series is designed for use in low power medical, dental and laboratory applications such as dialysis machines, monitoring equipment, instrumentation and infusion pump controls.

CE (LVD)

2 YEAR WARRANTY

All specifications are typical at nominal input, full load at 25°C unless otherwise stated

SPECIFICATIONS

OUTPUT SPECIFICATIONS

Voltage adjustability	+5.1V output on multi's 12V single 15V single 24V single	±3.0% 12V to 14V 15V to 18V 24V to 30V
Line regulation	LL to HL, FL All outputs on all units	±0.1% max.
Overshoot/undershoot	At turn-on no load	0%
Temperature coefficient	All outputs	±0.02%/°C
Overvoltage protection	Multi output 5.1V only 12V single 15V single 24V single	6.25V±0.75V 15.75V±1.0V 22V±1.5V 33V±2.5V
Output power limit	Primary power limited	Pin max. 160W Pout min. 110W
Short circuit protection		Burst mode operation

INPUT SPECIFICATIONS

Input voltage range		90 to 253VAC 127 to 357VDC
Input frequency range		47Hz to 440Hz
Input surge current	110VAC, 50Hz 230VAC, 50Hz	17A 35A
Safety ground leakage current	132VAC 264VAC	50µA 100µA

EMC CHARACTERISTICS

Conducted emissions	EN55022, FCC part 15	Level A
Radiated emissions	EN55022, FCC part 15	Level A
ESD air	EN61000-4-2, level 3	Perf. criteria 1
ESD contact	EN61000-4-2, level 4	Perf. criteria 1
Surge	EN61000-4-5, level 3	Perf. criteria 1
Fast transients	EN61000-4-4, level 3	Perf. criteria 1
Radiated immunity	EN61000-4-3, level 3	Perf. criteria 2
Conducted immunity	EN61000-4-6, level 3	Perf. criteria 2

GENERAL SPECIFICATIONS

Hold-up time	110VAC @ 80W 110VAC @ 110W 230VAC @ 80W 230VAC @ 110W	35ms 17ms 140ms 100ms
Efficiency	Multiple outputs 12V and 15V singles 24V single	70% typ. 72% typ. 75% typ.
Isolation voltage	Input/output Input/chassis	4000VAC 1500VAC
Switching frequency	At 100 Watts output At zero load	20 to 70kHz 100 to 250kHz
Approvals and standards (See Note 12)		VDE0750, IEC60601 IEC1010, UL2601 CSA C22.2 No. 125
Weight	Singles Multiple outputs	550g (19.4oz) 600g (21.2oz)
MTBF	MIL-HDBK-217E	125,000 hours

ENVIRONMENTAL SPECIFICATIONS

Thermal performance	Operating, see curve Non-operating 0°C to +50°C, amb. convection cooled +50°C to +70°C, amb. convection cooled 0°C to +50°C, 20CFM forced air +50°C to +70°C, 20CFM forced air Peak, 0°C to +50°C, max. 60 seconds	0°C to +70°C –40°C to +85°C 80W Derate 2W/°C 110W Derate 2.75W/°C 110W
Relative humidity	Non-condensing	5% to 95% RH
Altitude	Operating Non-operating	10,000 feet max. 40,000 feet max.
Vibration (See Note 11)	5Hz to 500Hz	2.4G approx.

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Single and quad output

ARTESYN TECHNOLOGIES

For the most current data and application support visit www.artesyn.com/powergroup/products.htm

OUTPUT VOLTAGE	OUTPUT CURRENTS			RIPPLE (4)	TOTAL REGULATION (5)	MODEL NUMBERS
	MAX (1)	PEAK (2)	FAN (3)			
+5.1V	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7901P
+12.0V	4.5A	9.0A	5.0A	120mV	±3.0%	
–12.0V	0.5A	1.5A	1.0A	120mV	±3.0%	
–5.0V	0.5A	1.5A	1.0A	50mV	±3.0%	
+5.1V (V_A)	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7902P
+24.0V (V_B)	3.5A	4.5A	4.5A	240mV	+10/–5.0%	
+12.0V	4.5A	9.0A	5.0A	120mV	±3.0%	
–12V	0.5A	1.5A	1.0A	120mV	±3.0%	
+5.1V	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7904P
+15.0V	4.0A	7.5A	5.0A	150mV	±3.0%	
-15V	0.5A	1.5A	1.0A	150mV	±3.0%	
-5V	0.5A	1.5A	1.0A	50mV	±3.0%	
12V (6)	7.0A	9.0A	9.0A	120mV	±2.0%	NFS110-7912 (6,7)
15V (6)	5.0A	7.3A	7.3A	150mV	±2.0%	NFS110-7915 (6,7)
24V (6)	3.5A	4.5A	4.5A	240mV	±2.0%	NFS110-7924 (6,7)

Notes

1. Convection cooled, 80W maximum.
2. Peak outputs lasting less than 60 seconds with duty cycle less than 10%. Total peak power must not exceed 110W.
3. Forced air, 20CFM at 1 atmosphere, 110W maximum.
4. Figure is peak-to-peak. Output ripple is measured across a 50MHz bandwidth using a 12 inch twisted pair terminated with a 47µF capacitor.
5. Total regulation is defined at the static output regulation at 25°C, including initial tolerance, line voltage within stated limits and output voltages adjusted to their factory settings. Also for NFS110-7902P, for 24V output stated regulation $I_A / I_B \leq 5$. This output will maintain ±5.0% regulation if $I_A \leq 5A$, where I_A = +5.1V output current and I_B = +24V output current.
6. Single output models have floating outputs which may be referenced as either positive or negative. Higher voltage supplies, may be adjusted over a wide output voltage range, as long as the total output power does not exceed 80 Watts (natural convection) or 110 Watts (forced air).
7. Power fail detect not available on single output models.
8. Derating curve is application specific for ambient temperatures > 50°C, for optimum reliability no part of the heatsink should exceed 90°C and no semiconductor case temperature should exceed 100°C.
9. Caution: Allow a minimum of 1 second after disconnecting the power when making thermal measurements.
10. The user should read the PSU installation instructions in conjunction with the relevant national safety regulations in order to ensure compliance.
11. Three orthogonal axes, random vibration, 10 minute test for each axis.
12. This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.

TRANSIENT RESPONSE		
NFS110-7901P	+5.1V (7.5A to 10A)	150mV peak, 1ms recovery
	+12V (2.5A to 5A)	100mV peak, 0.5ms recovery
	-12V (0.5A to 1A)	100mV peak, 0.5ms recovery
	-5V (0.5A to 1A)	100mV peak, 0.5ms recovery
NFS110-7902P	+5.1V (7.5A to 10A)	150mV peak, 1ms recovery
	+12V (2.5A to 5A)	100mV peak, 0.5ms recovery
	-12V (0.5A to 1A)	100mV peak, 0.5ms recovery
	24V (1.5A to 3A)	300mV peak, 1ms recovery
NFS110-7904P	+5.1V (7.5A to 10A)	150mV peak, 1ms recovery
	+15V (2.5A to 5A)	100mV peak, 0.5ms recovery
	-15V (0.5A to 1A)	100mV peak, 0.5ms recovery
	-5V (0.5A to 1A)	100mV peak, 0.5ms recovery
NFS110-7912	+12V (4.5A to 9A)	360mV peak, 1ms recovery
NFS110-7915	+15V (3.65A to 7.3A)	450mV peak, 1ms recovery
NFS110-7924	+24V (2.25A to 4.5A)	720mV peak, 1ms recovery

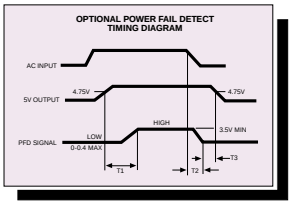
File Name: NFS110M.PDF Rev: 09 Oct 2002

AC (J1) mating connector

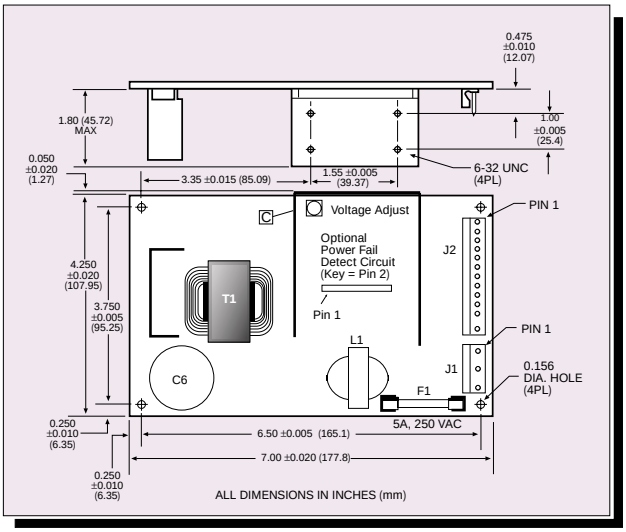
Molex 09-50-3051 or Molex 09-91-0500 mating connector with 2478 or equivalent crimp terminals.

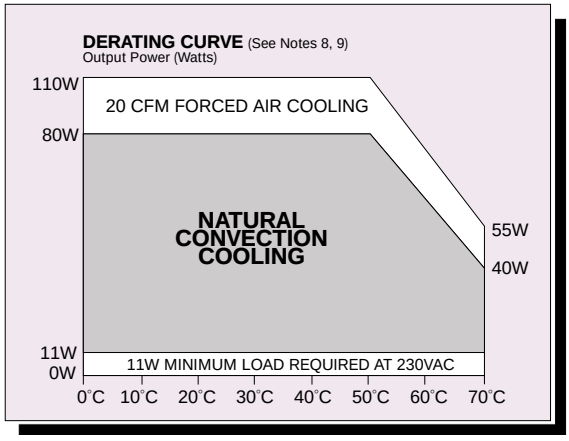
DC (J2) mating connector

Molex 09-50-3131 or Molex 09-91-1300 mating connector with 2478 or equivalent crimp terminals.



Power fail detect signal (See Note 7)
50ms ≤ T1 ≤ 200ms
T2 will vary with line and load
T3 ≥ 3ms
Pout: 110W
PFD output is an open collector which will sink ≤ 40mA in the low state





Mechanical Notes

- **A** Metallic or non-metallic stand-offs (maximum diameter 5.4mm) can be used in all four mounting holes without affecting safety approval.
- **B** The ground pad of the mounting hole near J1 allows system grounding through a metal stand-off to the system chassis.
- **C** The heatsink is grounded, and allows system grounding by mechanical connection to the system chassis.
- **D** The supply must be mechanically supported using the PCB mounting holes and may be additionally supported by the heatsink mounting holes.
- **E** It is always advisable to attach the power supply heatsink to another thermal dissipator (such as a chassis or finned heatsink etc). The resulting decrease in heat sink mounted component temperatures will improve power supply lifetime.
- **F** A standard L-bracket and cover is available for mounting which contains all screws connectors and necessary mounting hardware. Two different kits are available, order part number 'NFS110 COVER KIT' or 'NFS110C'.

International Safety Standard Approvals

VDE0750/EN60601-1/IEC601/IEC1010 File No. 10401-3336-1049 licence No. 2874

UL2601 File No. E147937

CSA C22.2 No. 125 File No. LR41062C

PIN CONNECTIONS				
J1	**–7901P**	**–7902P**	**–7904P**	**SINGLES**
Pin 1	AC Ground	AC Ground	AC Ground	AC Ground
Pin 2	AC Neutral	AC Neutral	AC Neutral	AC Neutral
Pin 3	AC Line	AC Line	AC Line	AC Line
J2				
Pin 1	+5.1V	+5.1V	+5.1V	V_{out}
Pin 2	+5.1V	+5.1V	+5.1V	V_{out}
Pin 3	+5.1V	+5.1V	+5.1V	V_{out}
Pin 4	Return	Return	Return	Return
Pin 5	Return	Return	Return	Return
Pin 6	Return	Return	Return	Return
Pin 7	Return	Return	Return	Return
Pin 8	+12V	+12V	+15V	V_{out}
Pin 9	+12V	+12V	+15V	V_{out}
Pin 10	PFD	PFD	PFD	N/C
Pin 11	–12V	–12V	–15V	N/C
Pin 12	Removed for Key			
Pin 13	–5V	+24V	–5V	N/C

N/C = no connection.

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